

ABSTRACT OF THE DISCLOSURE

A three-dimensional molecular assembly and method of formation are provided. The molecular assembly is formed on a substrate. The molecular assembly comprises: a first monolayer of seed molecules for initiating self-assembled molecular growth, the first monolayer formed on the substrate; a second monolayer of active molecules comprising a plurality of rotor and stator moieties, with one rotor moiety supported between two stator moieties; the second monolayer of active molecules formed on the first monolayer of seed molecules, with a one-to-one correspondence between molecules in the first monolayer and the second monolayer; a third monolayer of spacer molecules, formed on the second monolayer of active molecules, with a one-to-one correspondence between molecules in the second monolayer and the third monolayer; and a plurality of alternating second monolayers and third monolayers having the one-to-one correspondence.